400 Seventh Street, S.W.
Washington, D.C. 20590

U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

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Thank you for choosing crash data from the National Highway Traffic Safety Administration (NHTSA) for your research or other use. The information contained in this motor vehicle crash report is collected, maintained and distributed in accordance with Public Law 89-564. In accordance with this Public Law, NHTSA is required not to release any case information until completion of quality control procedures. These procedures include a review of the case material to extract all names, licenses and registration numbers, non-coded interview material, non-research related researcher comments in the margins, non-factual data, and the production number portion of the vehicle identification number (VIN).

If you requested NHTSA to query its database files in order to identify a specific crash, then that query was made using non-personal descriptors you provided for use in our search. This motor vehicle crash may have been identified from a data search and matches the general, non-personal descriptors you provided, but we cannot confirm that this is the specific crash report you requested.

If you have any questions with regard to the above procedures, please contact the Field Operations Branch, Crash Investigation Division, National Center for Statistics and Analysis at 202-366-4820. Again, please be advised that we cannot confirm that this is the case that you have specifically requested nor can we certify the information to be correct.

*** *** ***

DYNAMIC SCIENCE, INC.
In-Depth Accident Investigation

Contract DTNH22-94-D-27058
Case DSI-95-AB-23

[redacted] 1996

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient Catalog No.
DSI-95-AB-23		

4. Title and Subtitle	5. Report Date
In-Depth Accident Investigation [redacted] Washington	[redacted] 1996
	6. Performing Organization Report No.
7. Author(s) [redacted]	8. Performing Organization Report No. DSI-95-AB-23, Task 0039
9. Performing Organization name and Address: Dynamic Science, Inc. [redacted]	10. Work Unit No. (TRAIS)
	11. Contract or Grant no. DTNH22-94-D-27058
12. Sponsoring Agency Name and Address: U.S. Dept. of Transportation (NRD-32), National Highway Traffic Safety Administration, 400 7th Street, SW, Washington, DC 20590	13. Type of report and period Covered: In-Depth, On-Site, [redacted], 1996
	14. Sponsoring Agency Code

15. Supplemental Notes

Driver of 1989 Dodge Daytona killed during airbag deployment.

16. Abstract

This case was initiated because the driver died as a result of her interaction with a deploying airbag. This fatal collision occurred in [redacted] 1995 at [redacted] hours in the state of [redacted]. Vehicle 1, a 1989 Dodge Daytona driven by a 17 year old female, was stopped at a stop sign at a four-leg intersection facing north. Vehicle 2, a 1991 Pontiac 6000 LE driven by a female, was also stopped at this intersection facing in the opposite direction. The driver of Vehicle 2 entered the intersection, with the intention of going straight, and into the path of Vehicle 1 which was turning left. The left front of Vehicle 1 struck the left side of Vehicle 2. The driver's side airbag deployed at impact. The unrestrained driver of Vehicle 1 was pitched forward slightly and the deploying airbag caught her in the throat area. She was driven upward and to the left where she struck the A-pillar, left roof rail, and the roof. The driver of Vehicle 1 sustained fatal injuries (maximum AIS-5) which included a massive basilar skull fracture with traumatic disruption of bilateral cavernous sinuses and intrapetrous portions of carotid artery, intrapulmonary hemorrhage, and an abrasion to the anterior neck and under chin. She was comatose at the scene and had massive bleeding from both ears, nose and upper oral airway. Rescue personnel were called and she was transported to a local emergency room, where she was given 12 units of blood. At no point was there any response to resuscitation and she was pronounced dead at [redacted] hours, slightly less than three hours after the accident.

17. Key Words	18. Distribution Statement
Airbag fatality	General Public

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No of pages	22. Estimated Total Price
Unclassified	Unclassified	22	$5,202.02

TECHNICAL SUMMARY

CONTRACTOR: Dynamic Science, Inc.
CONTRACT NUMBER: DTNH22-94-D-27058
CASE NUMBER: Case DSI-95-AB-23

[redacted]

This case was initiated because the driver died as a result of her interaction with a deploying airbag.

This low-speed, fatal collision occurred in [redacted]1995 at [redacted]ours in the state of Washington. The weather was clear and the roadway dry.

Vehicle 1, a 1989 Dodge Daytona driven by a 17 year old female, was initially stopped at a stop sign at a four-leg intersection facing north. Vehicle 2, a 1991 Pontiac 6000 LE driven by a female, was also stopped at this intersection facing in the opposite direction. A non-contact vehicle was traveling westbound and made a left-hand turn to go south. The driver of Vehicle 2 followed this vehicle, entering the intersection with the intention of going straight. The driver of Vehicle 1 entered the intersection, intending to turn left to go west.

The left front of Vehicle 1 struck the left side of Vehicle 2, with Vehicle 1 having a CDC of 12FYEW1 and Vehicle 2 having a CDC of 10LPEW1. Vehicle 1 underwent a -14 km/h (-9 MPH) longitudinal velocity change and Vehicle 2 underwent -9 km/h (-5 MPH) longitudinal velocity change as computed using the SMASH program. The driver's side airbag deployed at impact. Vehicle 1 pushed Vehicle 2 into a counterclockwise rotation. Vehicle 1 came to rest in the western leg of the intersection facing west. Vehicle 2 came to rest in the southern leg of the intersection facing generally east. Vehicle 2 was driven to the side of the road post-crash.

The driver of Vehicle 1 sustained fatal injuries (maximum AIS-5) which included a massive basilar skull fracture with traumatic disruption of bilateral cavernous sinuses and intrapetrous portions of carotid artery, intrapulmonary hemorrhage, and an abrasion to the anterior neck and under chin. These injuries were sustained due to interaction with the supplemental restraint system (airbag). The unrestrained female occupant was seated with the seat in the foremost position. At impact, she was pitched forward slightly and the deploying airbag caught her in the throat area. She was driven upward and to the left where she struck the A-pillar, left roof rail, and the roof. She was comatose at the scene and had massive bleeding from both ears, nose and upper oral airway. She was unconscious and unresponsive to any stimuli at the scene. [redacted] were called and she was transported to a local emergency room, where she was given 12 units of blood. At no point was there any response to resuscitation. She was pronounced dead at [redacted]hours, slightly less than three hours after the accident.

The driver of Vehicle 2 sustained a possible rib injury.

Vehicle 1 was towed from the scene due to damage. Vehicle 2 was driven from the scene.

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The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the National Highway Traffic Safety Administration.

The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points be coupled with the investigator's expert knowledge and experience of vehicle dynamics and occupant kinematics in order to determine the pre-crash, crash, and post-crash movements of involved vehicles and occupants.

Because each crash is a unique sequence of events, generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicle(s) or their safety systems.

DYNAMIC SCIENCE, INC.
ACCIDENT INVESTIGATION
CASE NUMBER: DSI-95-AB-23

TABLE OF CONTENTS

ACCIDENT DATA:

Location:	[redacted] Washington
Area/Type:	Urban
Date/Time:	Fall
Accident Type:	Vehicle-to-vehicle / Front-to-side

Injury Severity:

Vehicle 1:	AIS=5, bilateral internal carotid artery disruption AIS=4, basilar skull fracture
Vehicle 2:	No codeable injuries

AMBIENCE:

Viewing Conditions:	Good
Cloud Cover:	Clear
Precipitation:	None
Temperature:	Unknown
Road Surface:	Dry

ROADWAY:

	VEHICLE 1	VEHICLE 2
Type:	Undivided, two-lane	Undivided, two-lane
Width:	68.4 ft.	68.4
Traffic Density:	Light	Light
Median:	None	None
Edge:	Curbed	Curbed
Surface:	Asphalt	Asphalt
Reported Defects:	None	None
Co-efficient of Friction (est.):	0.70	0.70
Vertical Alignment:	Level	Level
Horizontal Alignment:	Straight	Straight

Traffic Controls:

	VEHICLE 1	VEHICLE 2
Signals:	None	None
Signs:	Stop sign	Stop sign
Speed Limit:	48 km/h (30 MPH)	40 km/h (25 MPH)
Markings:	None	None

VEHICLES:

	VEHICLE 1	VEHICLE 2
Description:	1989 Dodge Daytona	1991 Pontiac 6000 LE
Odometer:	103290	Unknown
Engine:	2.5L EFI	Unknown
Vehicle Modifications:	None	None
Tire Condition:	Good	Unknown
Manual Restraints:	3-point lap and shoulder restraints at LF, RF, RR, and LR positions. Lap restraint at CR position.	Unknown
Automatic Restraints:	Driver's side supplemental restraint system (airbag)	Unknown
Reported Defects:	Lap and shoulder restraint at LF position could not be pulled out from retractor and was not in use in this case. This restraint was apparently not functional at the time this driver purchased the used vehicle.	None
Cargo:	None	Unknown
Windshield Damage:	None	None
Fleet:	NA	NA
Tow Status:	Towed due to damage	Driven

VEHICLE DAMAGE:

	VEHICLE 1	VEHICLE 2
Object Struck:	02	01
Event Number:	01	01
CDC:	12FYEW1	10LPEW1
Maximum Crush:	1.8 in.	Unknown

VEHICLE VELOCITY ESTIMATES:

	VEHICLE 1	VEHICLE 2
Impact Speed: (estimated)	18.3 km/h (11.41 MPH)	21.9 km/h (13.6 MPH)
Total Delta V:	14 km/h (9 MPH)	14 km/h (8 MPH)
Longitudinal Delta V:	-14 km/h (-9 MPH)	-9 km/h (-5 MPH)
Lateral Delta V:	-1 km/h (-1 MPH)	10 km/h (6 MPH)
Energy Dissipation:	11499 joules (8480 FT-LB)	12039 joules (8878 FT-LB)

Delta-Vs calculated using SMASH program the default stiffness values.

Assuming both vehicles stopped at the intersection prior to entering it. Calculate speed from stop at intersection to impact using 4 ft/sec/sec as an acceleration rate.

Vehicle 1:

$$S = \sqrt{2aD}$$

where

S = *speed after acceleration*

a = *acceleration rate*

D = *approximate distance*

Substituting/solving:

$$S = \sqrt{2*4*35} = 16.7 \textit{ fps} = 11.41 \textit{ MPH} = 18.3 \textit{ KPH}$$

Vehicle 2:

$$S = \sqrt{2aD}$$

where

S = *speed after acceleration*

a = *acceleration rate*

D = *approximate distance*

Substituting/solving:

$$S = \sqrt{2*4*50} = 20.0 \textit{ fps} = 13.64 \textit{ MPH} = 21.9 \textit{ KPH}$$

COLLISION SEQUENCE:

Pre-Crash: Vehicle 1, a 1989 Dodge Daytona driven by a 17-year-old female, was initially stopped at a stop sign at a four-leg intersection facing north. Vehicle 2, a 1991 Pontiac 6000 LE driven by a female, was also stopped at this intersection facing in the opposite direction. A non-contact vehicle was traveling westbound and made a left-hand turn to go south. The driver of Vehicle 2 followed this vehicle, entering the intersection with the intention of going straight. The driver of Vehicle 1 entered the intersection, intending to turn left to go west.

Crash: The left front of Vehicle 1 struck the left side of Vehicle 2, with Vehicle 1 having a CDC of 12FYEW1 and Vehicle 2 having a CDC of 10LPEW1. Vehicle 1 underwent a -14 km/h (-9 MPH) longitudinal velocity change and Vehicle 2 underwent -9 km/h (-5 MPH) longitudinal velocity change as computed using the SMASH program. The driver's side airbag deployed at impact.

Post Crash: Vehicle 1 pushed Vehicle 2 into a counterclockwise rotation. Vehicle 1 came to rest in the western leg of the intersection facing west. Vehicle 2 came to rest in the southern leg of the intersection facing generally east. Vehicle 2 was driven to the side of the road post-crash.

Occupant Kinematics:

The unrestrained female occupant was seated with the seat in the forwardmost position, as shown in Figure 1. Given the accident configuration it seems likely that her right foot was on the accelerator, her left hand lower than the right for the turning manuever, and the left foot on the floorboard. It is also likely that the driver was looking to the left to some degree. At impact, she was pitched forward slightly and the deploying airbag caught her in the throat area. Her head was rotated rearward and she was driven upward and to the left where she struck the A-pillar, left roof rail, and the roof (see Figure 2).

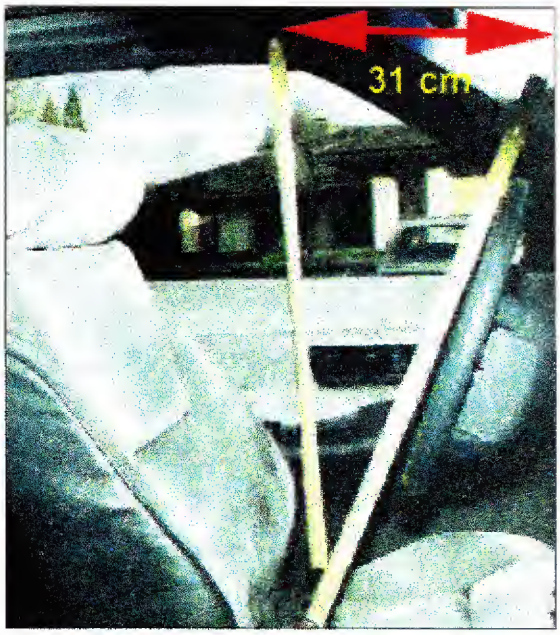


Figure 1. Exemplar view showing seat location relative to steering wheel.

According to the autopsy report there were no external injuries to the scalp area; regardless, there was a clear indication that the driver did strike the areas mentioned earlier. The basilar skull fracture appears to have come about as a combination of the impact of the airbag and roof strike. According to our medical consultant, there were two possible mechanisms of injury. The airbag could have gotten the driver in a chin forward position and moved the mandible to the posterior relative to the rest of the head. This could shear the jaw joints. The more likely scenario would have been a lifting motion in which the airbag inflated beneath the chin and lifted the head into the roof rail/A-pillar area.

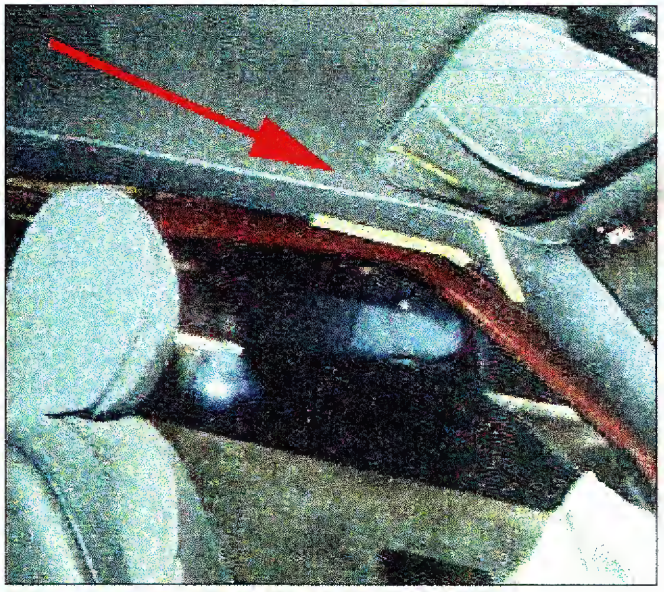


Figure 2. Occupant contact area.

Airbag System: Vehicle 1 was equipped with an H-configuration, hub mounted driver's side supplemental restraint system (airbag). The airbag was not tethered. There are two vent holes present on the back side of the airbag (facing toward the front of the vehicle when deployed). The airbag is 54 cm in diameter. The airbag deployed normally. There was no damage to either the module covers or the airbag itself.

Scene Clearance: Vehicle 1 was towed from the scene due to damage. This vehicle was placed in secure police storage subsequent to the accident. Vehicle 2 was driven from the scene.

Safety Standards: There were no violations of Federal Motor Vehicle Safety Standards and Regulations found during the inspection of the case vehicle.

DRIVER AND OTHER OCCUPANTS:

VEHICLE 1

	DRIVER
Age/Sex:	17/Female
Seated Position:	Left front
Seat Type:	Bucket with folding back
Height:	150 cm (59 in.)
Weight:	57 kg (126 lb)
Occupation:	Student
Pre-existing Medical Condition:	Unknown
Alcohol/Drug Involvement:	None
Driving Experience:	≈ 1-2 years, based on age
Body Posture:	Presumed to be normal, upright
Hand Position:	Unknown
Foot Position:	Right foot on accelerator, left on floorboard
Restraint Usage:	Lap and shoulder not used. According to police interviews with the driver's relatives, the restraint system was not functional at the time the vehicle was purchased.
Additional Occupants:	None

DRIVER AND OTHER OCCUPANTS (con't):

VEHICLE 2

	DRIVER
Age/Sex:	20/Female
Seated Position:	Left front
Seat Type:	Bucket
Height:	165 cm (65 in.)
Weight:	91 kg (200 lbs.)
Occupation:	Unknown
Pre-existing Medical Condition:	Unknown
Alcohol Involvement:	None
Driving Experience:	Unknown
Body Posture:	Normal, upright
Hand Position:	Unknown
Foot Position:	Unknown
Restraint Usage:	Lap and shoulder used
Additional Occupants:	None

INJURIES:

Vehicle 1

	INJURY	OIC CODE	ICD-9	SOURCE / Confidence[1]
DRIVER:	Disruption of internal carotid artery (left)	121002.5,2	900.03	Roof/A-pillar/2
	Disruption of internal carotid artery (right)	121002.5,1	900.03	Roof/A-pillar/2
	Massive basilar skull fracture extending across the midline through the petris portions of the left and right temporal bones and extending up the lateral temporal bones	150206.4,8	801.45	Roof/A-pillar/2
	Abrasion to anterior neck	310202.1,5	910.0	Airbag/1
	1.5 cm abrasion over right clavicle	410402.1,1	911.0	Unknown/9
	Small contusions on lateral aspect of left bicep	710402.1,2	923.03	Unknown/9
	1.5 cm contusion to left forearem	710402.1,2	923.10	Unknown/9
	Abrasion to chin	210202.1,8	910.0	Airbag/1

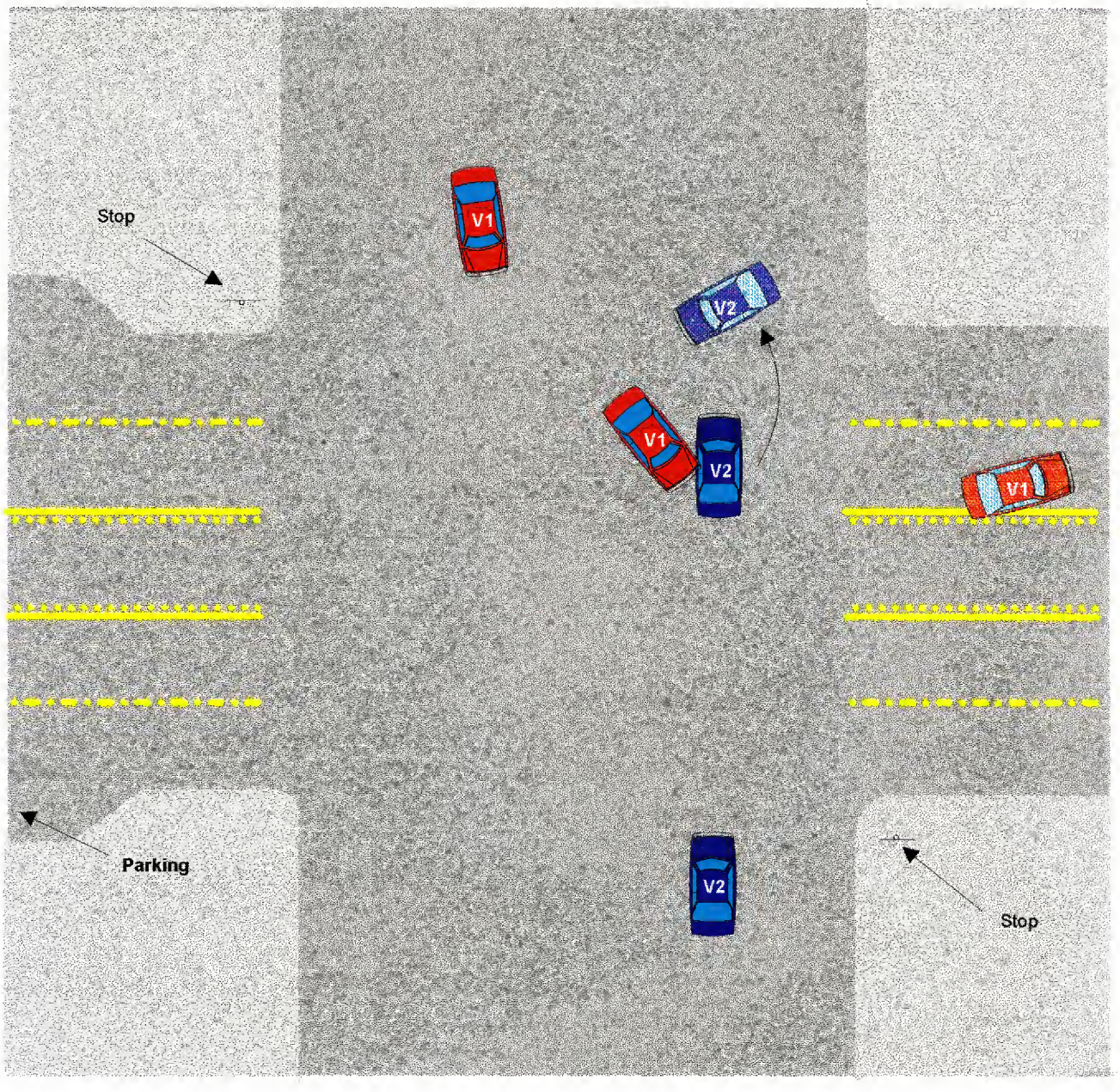
Additional injury notes: The victim in this case aspirated an extensive amount of blood. During resuscitation attempts she was given 14+ units of blood. Permission for tissue donation was granted by the victim's parents. In addition to a cardiectomy, skin, pelvic girdles, long bones, bilateral scapulae and proximal humeri, and lumbar and thorasic vertebral bodies were harvested.

[1] 1=Certain, 2=Probable, 3=Possible, 9=Unknown

Vehicle 2

	INJURY	OIC CODE	ICD-9	SOURCE
DRIVER:	No codeable injuries for the driver of Vehicle 2.			

Scene Diagram



Case Number: DSI-95-AB-23

Scale: 1" = 20'

NORTH

Abbreviations Used In Scene And Photographic Documentation

ft	Feet
in	Inches
AIS	Abbreviated Injury Scale
BLF	Begin Left Front
BLR	Begin Left Rear
BRF	Begin Right Front
BRR	Begin Right Rear
CBE	Cab Behind Engine
CCW	Counterclockwise
CDC	Collision Deformation Classification
CG	Center of Gravity
CM	Centimeter
COE	Cab Over Engine
CW	Clockwise
E, EB	East, Eastbound
ELF	End Left Front
ELR	End Left Rear
ERF	End Right Front
ERR	End Right Rear
FRP	Final Rest Position
I	Interstate Highway
IP	Intermediate Point
KG	Kilogram
KPH	Kilometers Per Hour
LF	Left Front
LR	Left Rear
M	Meter
N, NB	North, Northbound
NE	Northeast
NW	Northwest
PDOF	Principal Direction of Force
POI	Point of Impact
R	Radius of Curvature
RF	Right Front
RL	Reference Line
RP	Reference Point
RR	Right Rear
S, SB	South, Southbound
SE	Southeast
SW	Southwest
T	Time or Elapsed Time (in seconds)
V1	Vehicle Number 1
W, WB	West, Westbound

PHOTO INDEX

Case No. DSI-95-AB-23

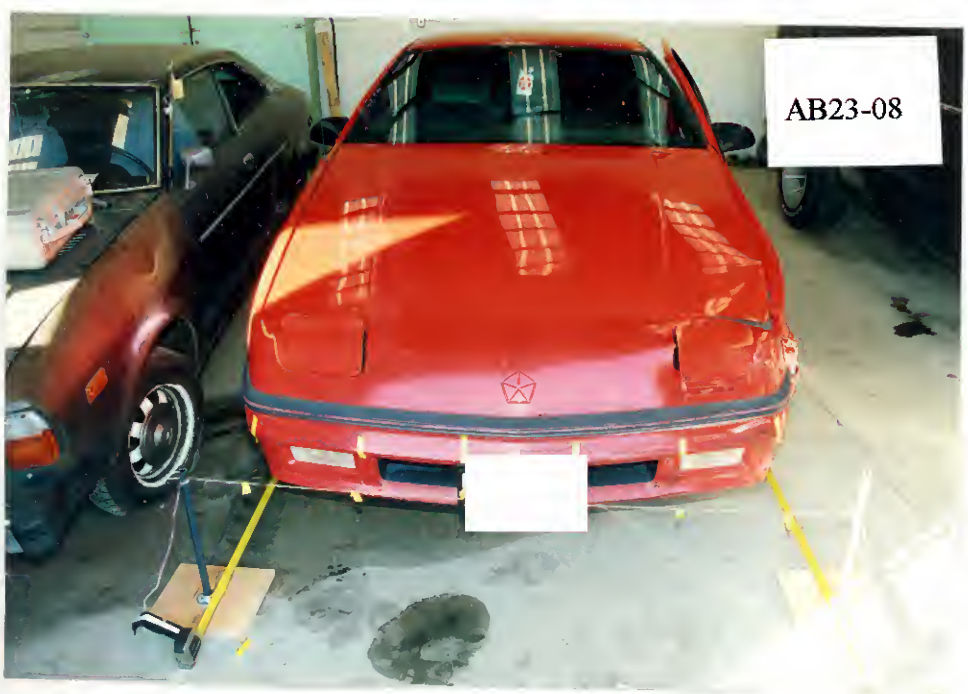
PHOTO NO.	VEHICLE NO.	DIRECTION OF PICTURE	SUBJECT MATTER
1-2	1	North	Path to area of impact.
3	1	NW	Area of impact.
4-5	2	South	Path to area of impact.
6	2	South	Area of impact.
7-17	1	CCW	Vehicle exterior.
18-43	1	NA	Vehicle interior.

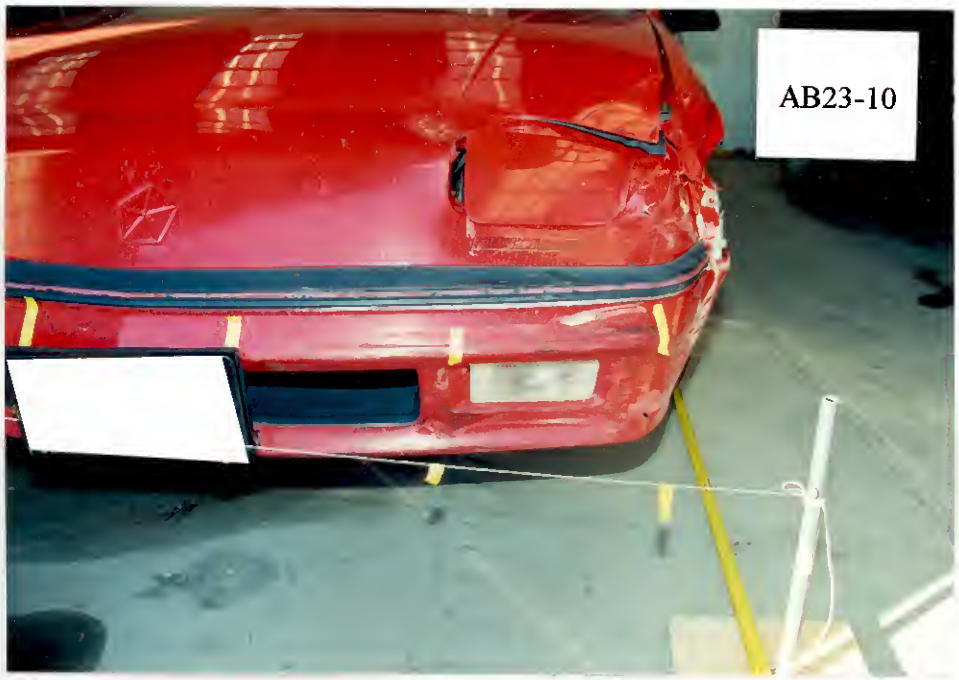

AB23-01

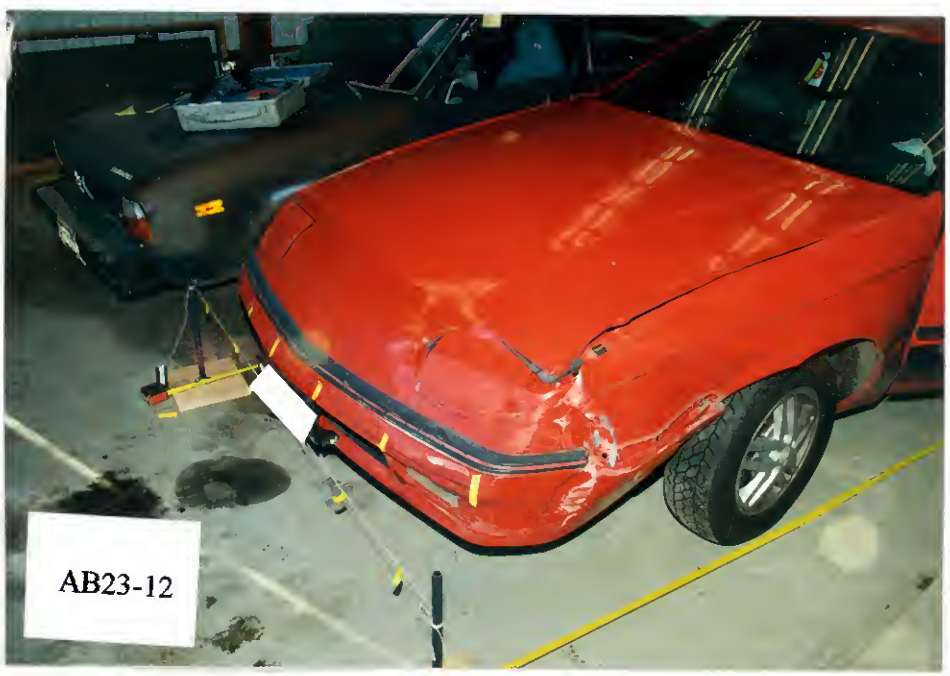

AB23-02


AB23-05


AB23-06







"GRAPHIC"
PHOTOGRAPHS AND IMAGES

The following "GRAPHIC" Photographs and Images have been removed from this case.

Photo's # 17-26 Page's # 31-35

If you would like a copy of these photographs and/or images please write to:

MARJORIE SACCOCCIO
VOLPE NATIONAL TRANSPORTATION SYSTEMS CENTER
55 BROADWAY
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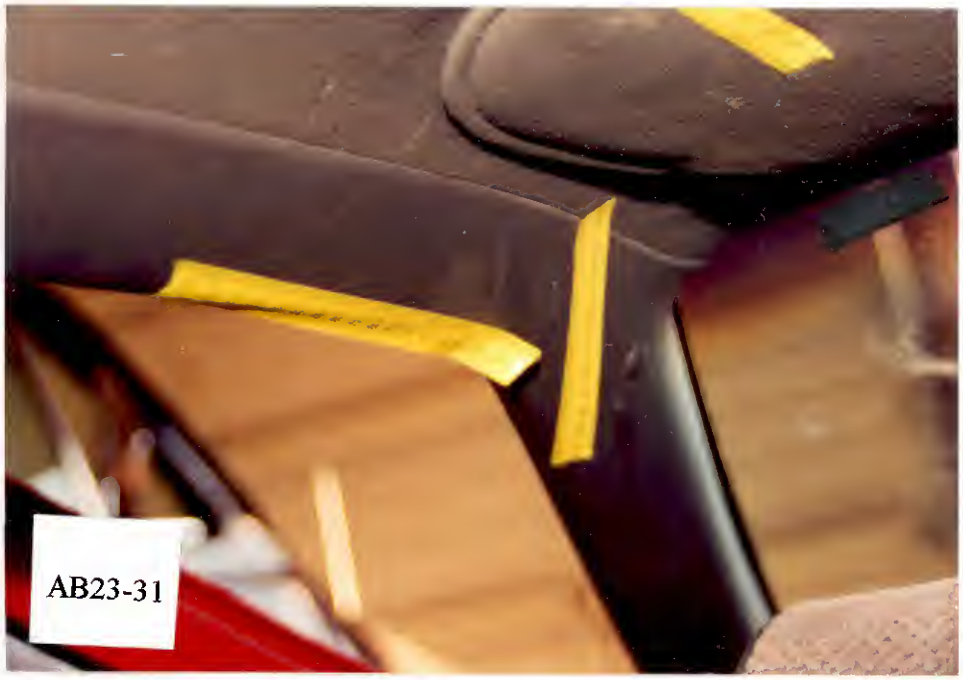
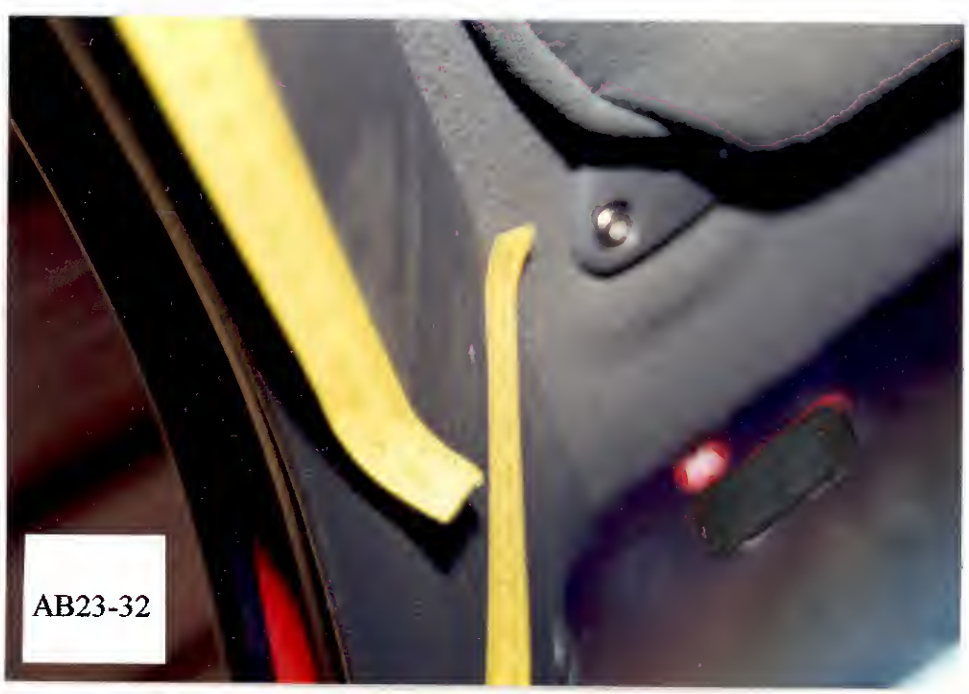
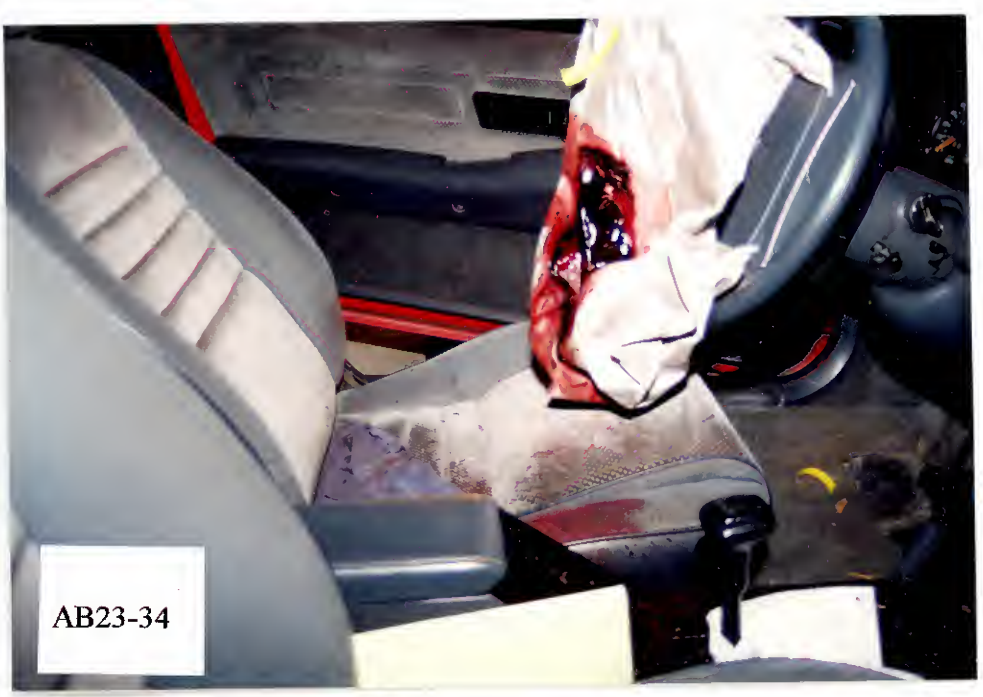
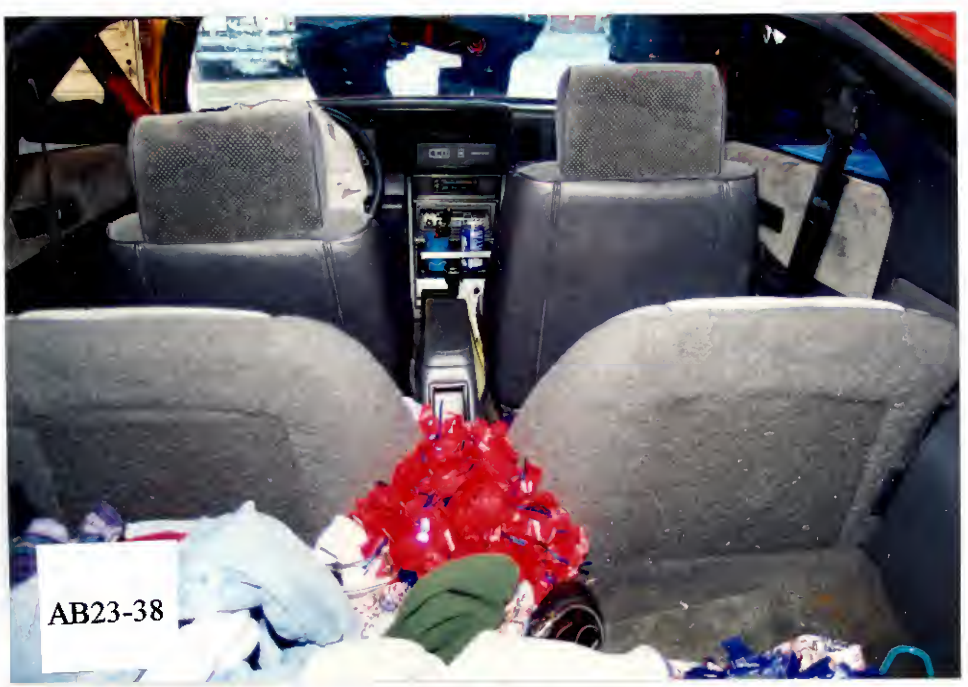
In the body of your request please include the case, photograph and image number(s).



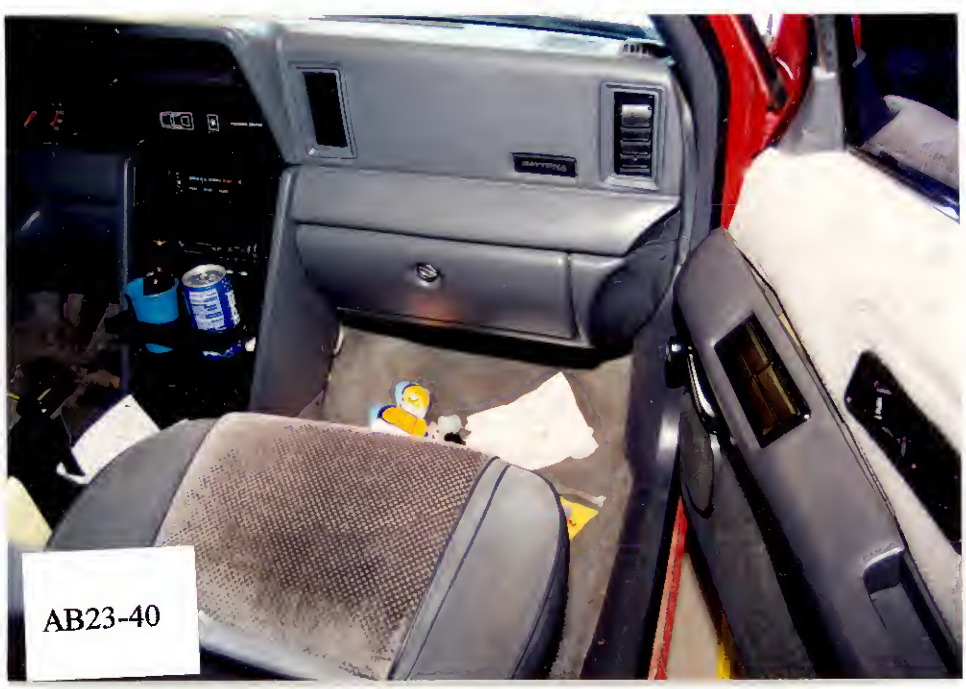





AB23-37

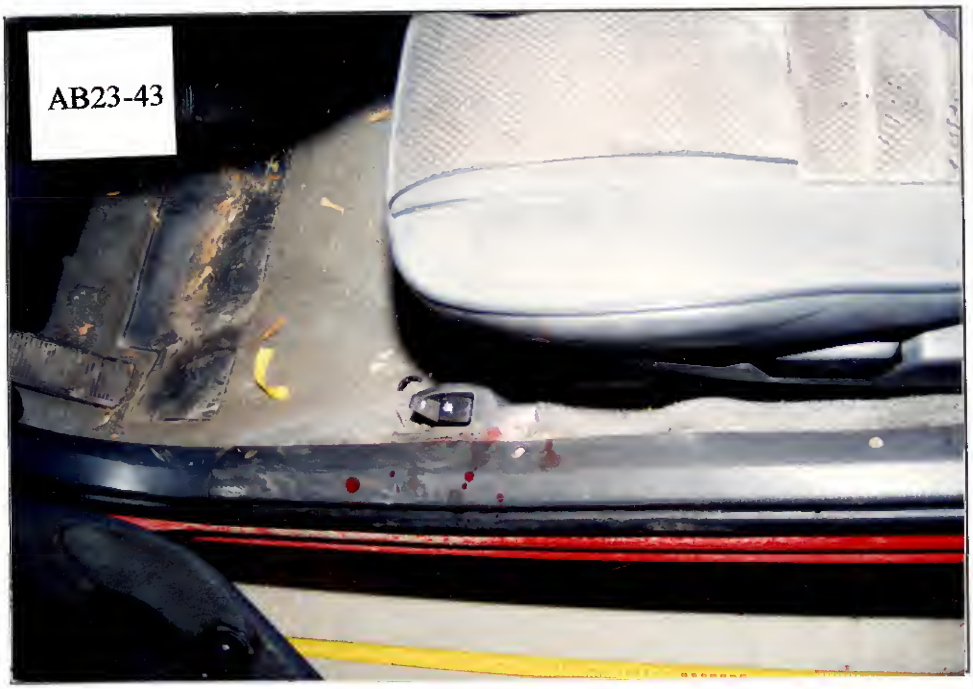

AB23-38


AB23-39


AB23-40


AB23-41


AB23-42



POLICE PHOTO INDEX

Case No. DSI-95-AB-23

PHOTO NO.	VEHICLE NO.	DIRECTION OF PICTURE	SUBJECT MATTER
1-3	1	East	Final rest.
4	1	North	Final rest.
5-7	2	North	Rotational skidmarks to final rest.
8	2	North	Final rest (Note: vehicle was driven to this location.)
9-10	1	West	Final rest.
11	2	North	Final rest.
12-18	1	NA	Close up views of vehicle exterior.
19-24	2	NA	Close up views of vehicle exterior.

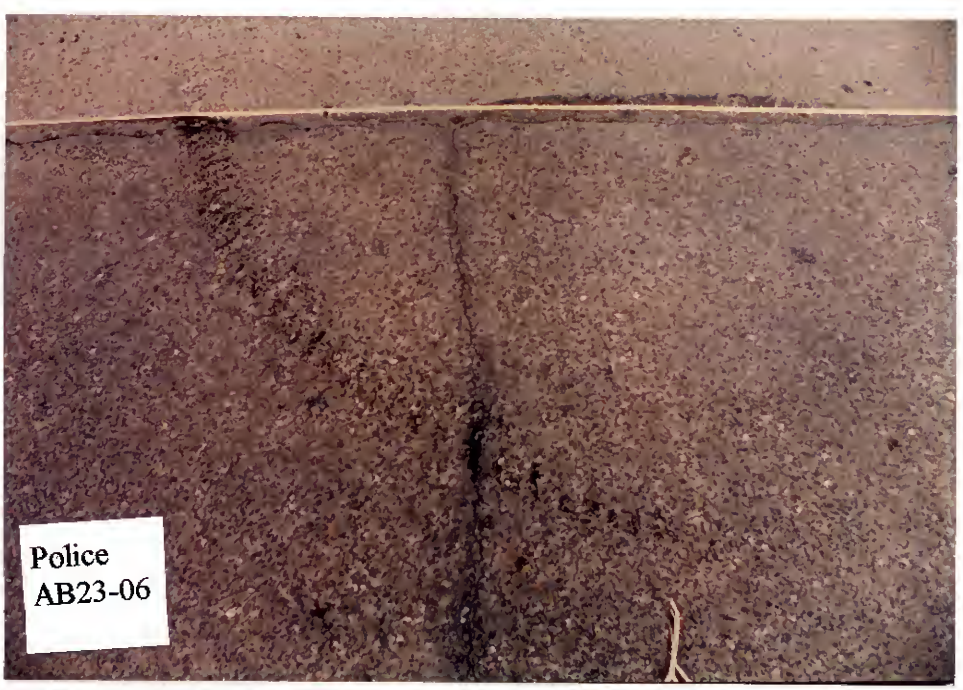
Police
AB23-01

Police
AB23-02


Police
AB23-03


Police
AB23-04


Police
AB23-05


Police
AB23-06


Police
AB23-07


Police
AB23-08


Police
AB23-09

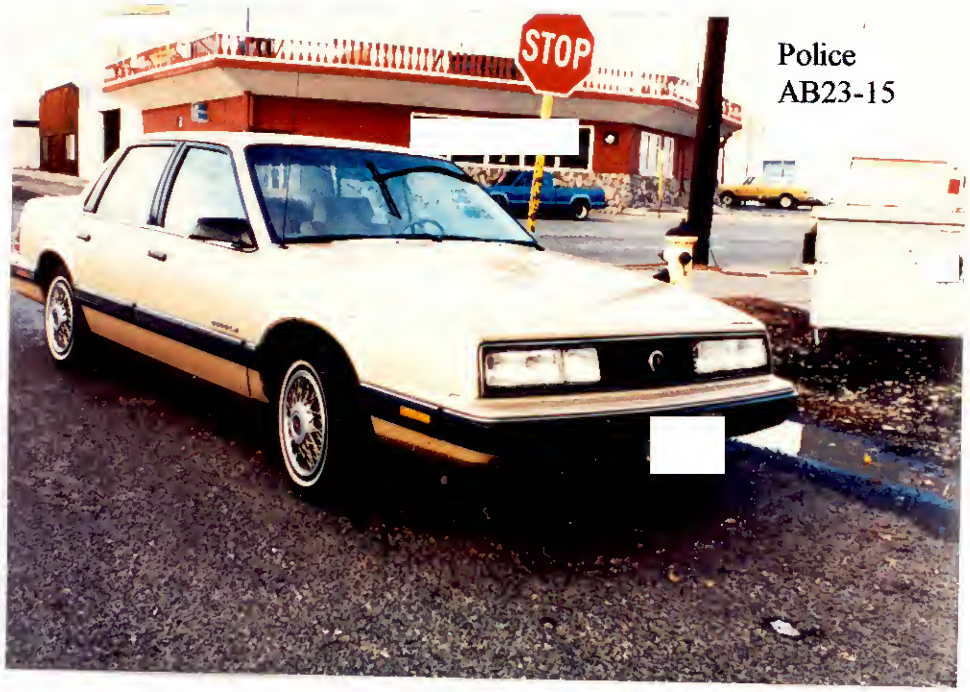

Police
AB23-10

Police
AB23-11

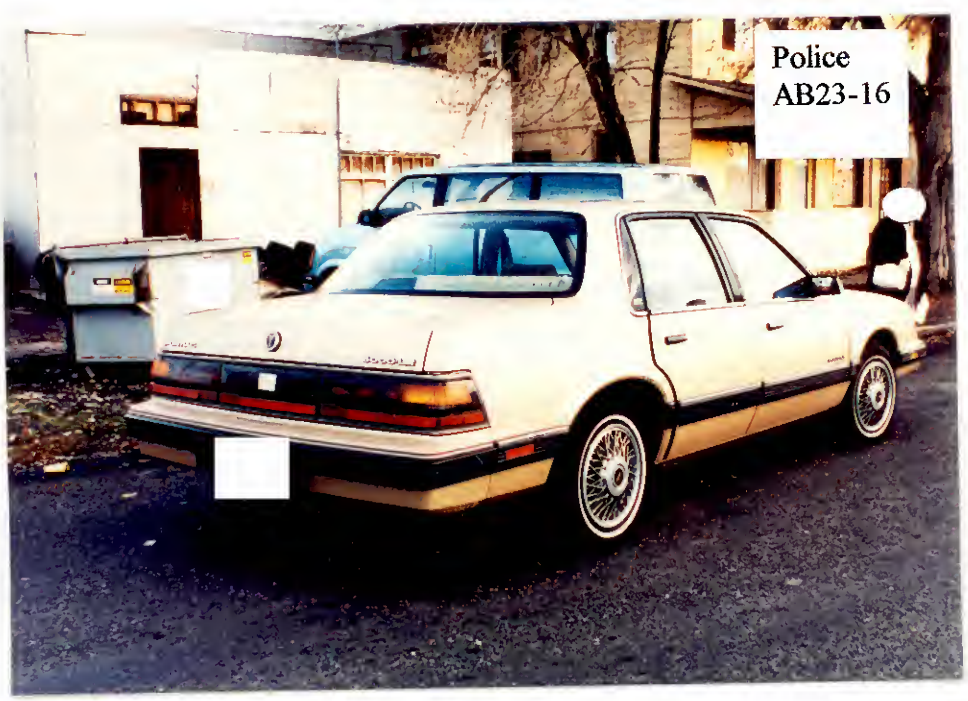
Police
AB23-12

Police
AB23-13

Police
AB23-14



Police
AB23-15

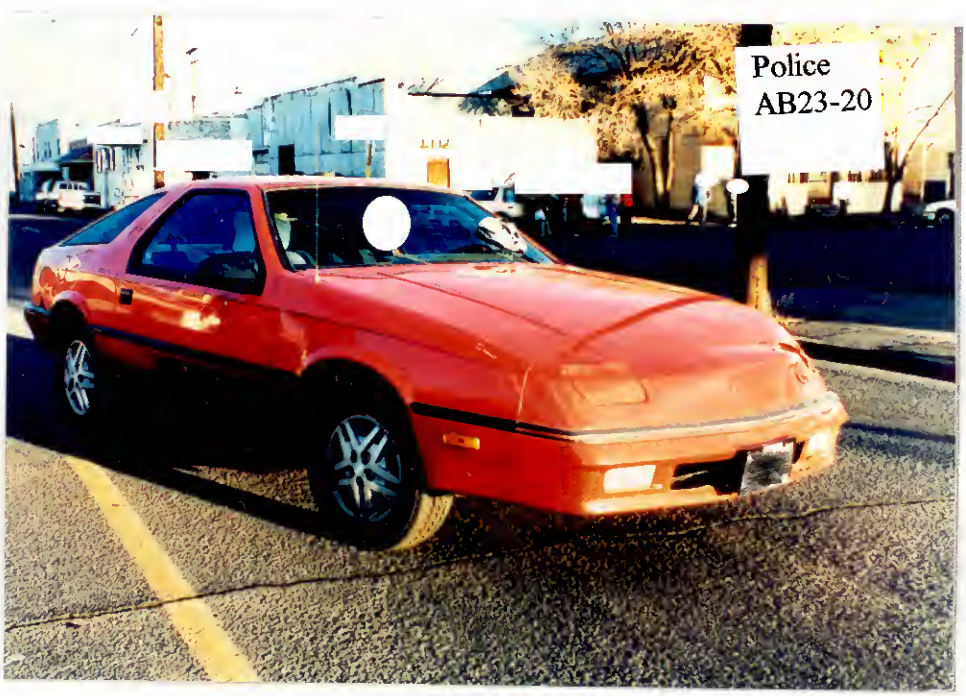


Police
AB23-16


Police
AB23-17


Police
AB23-18


Police
AB23-19
STOP


Police
AB23-20

Police
AB23-21

Police
AB23-22


Police
AB23-23


Police
AB23-24

CAUTION:

THE FOLLOWING PHOTOGRAPHS CONTAIN GRAPHIC VIEWS OF THE CASE VEHICLE DRIVER AS TAKEN DURING THE AUTOPSY.

AUTOPSY PHOTO INDEX

Case No. DSI-95-AB-23

PHOTO NO.	VEHICLE NO.	DIRECTION OF PICTURE	SUBJECT MATTER
1-3	NA	NA	Abrasions to neck and chin.
4-6	NA	NA	Fracture to skull.

CASE NUMBER DS9523

MISSING PHOTOGRAPHS

THE FOLLOWING PHOTOGRAPHS ARE NOT INCLUDED IN THIS CASE:

PHOTO NUMBER(S)	PAGE NUMBER(S)
1-6	

PR[redacted] [redacted]TER

POSTMORTEM EXAMINATION

NAME: BI[redacted] AGE: 17 SEX: F RACE: C PATH NO.: [redacted]

DOB [redacted]

ADMITTED: [redacted]95 (1523 HRS) HOSP. NO: [redacted]

DEATH DATE: [redacted]95 (1755 HRS)

AUTOPSY DATE: [redacted]/95 [redacted]

PLACE OF AUTOPSY: P[redacted] [redacted]ER

PATHOLOGIST: [redacted]

ATTENDING PHYSICIAN(S): [redacted], [redacted], [redacted], I.D.;

[redacted]

FINAL MICROSCOPIC AND ANATOMICAL FINDINGS:

CORONER'S CASE

1. MASSIVE BASILAR SKULL FRACTURE WITH TRAUMATIC DISRUPTION OF BILATERAL CAVERNOUS SINUSES AND INTRAPETROUS PORTIONS OF CAROTID ARTERY.

2. INTRAPULMONARY HEMORRHAGE (ASPIRATION).

3. ABRASION ANTERIOR NECK AND INFERIOR CHIN.

4. NO OTHER TRAUMA IDENTIFIED.

5. ACCESSORY SP[redacted]EEN (SMALL).

H[redacted]C/dks

[redacted]

[redacted]

CLINICAL SUMMARY

This 17-year old white female was injured in a motor vehicle accident. She was the driver of a vehicle which struck another car. This was a relatively low-speed accident estimated to be around 11-12 miles per hour. She was not wearing a seat belt. The air bag deployed. She immediately became comatose at the scene and had massive bleeding from both ears, nose and upper oral airway. The patient was unconscious and unresponsive to any stimuli at the scene. Her pupils were dilated and fixed. In the [redacted] an airway was secured. Massive blood replacement to the total of approximately 12 units of blood was done. Her blood pressure continued to drop with no response to fluid administration. At no time was there any response to resuscitation. A CAT scan evaluation showed a basilar skull fracture extending across midline. Clinically she had massive hemorrhage secondary to suspected carotid artery laceration. There was no other significant clinical history known. Autopsy permission was granted by M[redacted]. Permission for tissue donation was granted by the patient's parents. On [redacted]95 at 0100, the tissue harvest team from [redacted] in [redacted] took the patient to a Surgery Room where a cardiectomy was performed, skin was harvested from the back, bilateral pelvic girdles and long bones of the legs were harvested, and bilateral scapulae and proximal humeri were harvested. Additionally, the lumbar vertebrae plus T-11 and 12 vertebral bodies were also harvested.

GROSS DESCRIPTION

This was a brown-haired female that showed an area on the inferior of the jaw and anterior neck of approximately 8 x 4 x 4 cm redness and marked abraision having the appearance of "road rash". A 2 cm open right subclavial cut-down site is present. A circular 1.5 cm diameter bruise is present over the right clavicle. Several small contusion-like marks are present on the lateral aspect of the left biceps region. Multiple venipuncture marks are present in the bilateral antecubital fossae. A small 1.5 cm dark purple contusion is present over the left forearm. No other marks or abnormalities are noted. The patient has brown eyes with the pupils in mid position. The teeth are in fair repair. There is minimal edema of the lower lip. The anterior neck appears slightly full. No massive hematoma externally is identified in the neck. The hair contains a large amount of dry blood. During the Tissue Harvest procedure, liquid blood continues to drip from both ears, more on the right than the left. The posterior aspect of the body shows mild lividity, but no lesions. No other lesions or evidence of trauma, except as noted above, are seen. The breasts are moderately small and adolescent appearing. The pubis shows a normal female escutcheon. The patient is small female appearing to be approximately 5 feet tall.

During the pericardiectomy procedure, some blood could be seen in the superior mediastinum. This appeared to be only a small amount disecting around the thymus. The blood extended downward only to the superior aspect of the pericardium. The pericardium itself was dry and clean with no evidence of bleeding. The heart was grossly normal externally with only a few small epicardial petechiae.

The remainder of the autopsy was completed the afternoon following the tissue harvest. Changes to the body from tissue harvest include a midline 45 cm incision for myocardectomy and vertebral body harvest, a Pfannenstiel 22 cm type horizontal incision immediately above the symphysis pubis and bilateral 94 cm right and 96 cm left anterior leg incisions for harvest of lower limb long bones. Additionally, 48 cm right sided and 47 cm left sided curved incisions extend over the scapula region down the posterior aspect of the arms secondary to

[redacted]

P.C.

The median incision is opened. Extension of hemorrhage dissecting slightly surrounding the thymus is seen in the mediastinum. This is more on the right than the left. It extends down the periaortic chain to near the diaphragm level. No free blood is present in either left or right pleural space. The lungs are posteriorly congested, heavy wet and appear internally hemorrhagic. The right lung weighs 400 grams, left lung 400 grams. Both lungs show normal lobation. The tracheobronchial tree basic structure is unremarkable. A small amount of free blood is present within the tracheobronchial tree. The most prominent intrapulmonary hemorrhage is present in the bilateral lower lobes. No intrinsic pulmonary structural abnormality is present.

The residual aortic arch. ascending and descending, is normal. The vena cavae are unremarkable. (The heart has been previously harvested). There is no evidence of any trauma to the anterior chest wall or ribs. The superior chest is incised with a submammary U-shaped incision and the neck structures are disected free. There is hemorrhage in the soft tissues overlying primarly the right side of the anterior neck structures. This appears contiguous with the superior mediastinal hemorrhage. No hematoma is present as such. The blood appears only to be hemorrhage disecting through the soft tissue planes. The intracervical portions of both left and right external carotid arteries are intact to the base of the skull bilaterally. The thyroid is present and is grossly unremarkable. The base of the tongue, larynx, trachea and cervical esophagus are all unremarkable. The esophagus also contains hemorrhagic material. The soft tissues anterior to the cervical spine are clean and show no evidence of hemorrhage. The cervical spine shows no evidence of fracture or dislocation. The skin abrasions noted on the chin and anterior neck are superficial only.

The abdomen is opened by opening the median tissue harvest incision. There is no free blood within the abdomen. The abdominal organs are all in their normal positions. There is no evidence of abdominal trauma. The stomach is present in the usual position and contains a small amount of bloody material. The small bowel, large bowel including appendix are all grossly unremarkable. The bowel content, save for the small amount of bloody material in the stomach, is grossly unremarkable. The 120-gram spleen is present in the left upper quadrant. Along the anterior aspect of the omentum are seen three 3-5 mm accessory spleens. The tan-pink pancreas is present in its usual position and is grossly not remarkable. The 1100-gram liver is unremarkable. The gallbladder is present and is without stones. The extrahepatic biliary ducts are patent to the duodenum.

Both adrenal glands are present in their usual position and are brilliant yellow-tan and grossly unremarkable. The kidneys each weigh 110 grams. The capsules strip easily revealing moderately prominent fetal lobulation. The pyelocalyceal systems and ureters are unremarkable. The bladder is unremarkable and contains no urine. The bilateral ovaries and fallopian tubes are unremarkable. The uterus is a nongravid uterus. The endometrium is lined with tan endometrium with no gross abnormalities.

The lumbar vertebral bodies and T-11 and 12 have been previously harvested. The exposed anterior spinal cord shows no significant abnormalities and no evidence of neoplasm or hemorrhage.

On reflection of the scalp anteriorly there is no evidence of any trauma to the vertex or forehead region and no galeal or periosteal hematoma formation. The upper masseter muscle on the right shows a small amount of hemorrhage extending from a crack identifiable in the right temporal bone. Upon removal of the skull cap, the basilar skull fracture extends into the temporal bone approximately 50% up the lateral aspect of the skull. This is seen on both sides of the excision of the bony skull cap. The dura remains intact over the brain. After removal of the dura, there is mild to minimal staining of the arachnoid over the right cerebral hemisphere. [illegible] present. There is no extradural hematoma and there is no intradural free hemorrhage.

After removal of the brain, a massive basilar skull fracture is readily apparent extending across the midline through the petris portions of the left and right temporal bones and extending up the lateral temporal bones. The right side appears to be displaced anterior-posteriorly 3-4 mm whereas the left side is more approximated. The brain weighs 1225 grams and appears symmetrical. The vertebral basilar vessels appear intact. There are no atheromatous changes.

The pituitary gland is intact and not remarkable. The bilateral cavernous sinuses appear to be disrupted and torn bilaterally. The carotid artery in the cavernous sinuses bilaterally appear to be disrupted. The main hemorrhage appears to be extending in the soft tissue directly into the middle ear. The disruption appears to be within the cavernous sinus in the petris portion of the bones. An intact carotid artery cannot be identified on either left or right, although the bony displacement is greater on the right than the left. The frontal bones, superior portion of the orbit and the nasal olfactory plate are all intact without fracture.

Post resection of the cardiac valves, the heart weighs 217 grams. The coronary arteries remaining are grossly not remarkable. The valves have been removed. Only a small portion of the posterior mitral leaflet remains. The majority of the tricuspid valve remains. The myocardium on the right side is 0.4 cm in thickness. The left ventricular myocardium is 1.3 cm in thickness. The myocardium throughout is a uniform red-brown with no evidence of any gross abnormality.

Post fixation, the brain demonstrates a slight subfusion of blood over the vertices, but no real volume of hemorrhage. The brain is symmetrical. There is a minimal amount of hemorrhage in the posterior horn of the right lateral ventricle. No other specific lesions are identified within the cerebral hemispheres. No significant lesions are identified in the cerebellum. No significant lesions are identified in the midbrain or cervical cord.

MICROSCOPIC DESCRIPTION

MYOCARDIUM: Sections through the heart are unremarkable.

PULMONARY SYSTEM: Sections demonstrate pulmonary edema and aspirated blood filling large areas of the alveoli. The basic underlying lung structure is unremarkable.

GASTROINTESTINAL SYSTEM: Sections through stomach, small bowel and colon all are unremarkable.

LIVER: Sections are unremarkable.

PANCREAS: Sections are unremarkable.

GENITOURINARY SYSTEM: Sections through the kidney demonstrate a few lymphoid cortical aggregates. The tubules appear to have very early necrotic changes. Sections through the uterus demonstrate secretory phase endometrium. The ovaries are unremarkable, as are the fallopian tubes.

[redacted]

INTEGUMENT: Sections through the breast are unremarkable.

RETICULOENDOTHELIAL SYSTEM: Sections through the spleen and a small accessory spleen are unremarkable.

CENTRAL NERVOUS SYSTEM: Sections through the brain demonstrate a minor microscopic area of subarachnoid hemorrhage consisting of a few red cells extravasated in the subarachnoid space. The cerebellum demonstrates early anoxic changes. Sections through the midbrain demonstrate an occasional rare vessel showing some mild perivascular extravasation.

Sections through the bilateral petrous bones shows normal bone structure. The marrrow cavities present are active hematopoietic marrow. The soft tissue demonstrates extensive and massive hemorrhage through the fat and adjacent to large nerves.

FINAL SUMMARY

This 17-year old was involved in an automobile accident. Anatomic findings include a massive basilar skull fracture with relatively small amounts of internal hemorrhage. Extensive soft tissue hemorrhage at the base of the skull adjacent to the area of skull fracture where a vascular tear is present. A small amount of subarachnoid blood extravasation is present, but significant intracranial hemorrhage is not present. A small amount of hemorrhage is seen in the soft tissue extending down to the superior mediastinum, but significant amounts of blood are not seen internally. The 14+ units of blood the patient was given clinically were externally lost through the ears and upper airway. Hemorrhage in the upper airway is confirmed by extensive infilling of the lungs with blood. The only anatomic abnormality save the traumatic injuries and pulmonary blood aspirate is a very small accessory spleen. The trauma was relegated to the anterior chin abrasions and the skull fracture with resultant hemorrhage.

Pathologist

HMcC/dks

[redacted]

BEST AVAILABLE COPY

30 RECEIVED

TYPE OR PRINT IN PERMANENT BLACK INK

LOCAL FILE NUMBER

CERTIFICATE OF DEATH

STATE FILE NUMBER

DECEDENT

1 NAME (First / Middle / Last)	2 SEX (M / F)	3 DEATH DATE (Mo. Day. Yr)
[redacted] L	Female	[redacted] /1995

4 AGE LAST BIRTHDAY (Yrs)	5 UNDER 1 YEAR (MOS / DAYS)	6 UNDER 1 DAY (HOURS / MINS)	7 BIRTHDATE (Mo. Day. Yr)	8 BIRTHPLACE (City, State or Foreign Country)	9 WAS DECEDENT EVER IN U.S. ARMED FORCES? (Yes / No)	10 COUNTY OF DEATH
17			[redacted]	[redacted]	No	[redacted]

11 CITY, TOWN OR LOCATION OF DEATH	12 PLACE OF DEATH—☒ BOX FOR PLACE THEN GIVE ADDRESS OR INSTITUTION NAME 1 ☐ HOME 2 ☐ IN TRANSPORT 3. ☑ EMERG RM/OUT PTN 4 ☐ HOSP 5 ☐ NURSING HOME 6 ☐ OTHER PLACE	13 SMOKING IN LAST 15 YEARS? (Yes / No)
	[redacted] Center (3)	No

14 MARITAL STATUS—Married, Never Married, Widowed, Divorced (Specify)	15 SURVIVING SPOUSE (If wife, give maiden name)	16 SOCIAL SECURITY NO	17 DECEDENT'S EDUCATION (Specify only highest grade completed)	
			Elementary/Secondary (0-12)	College (1-4 or 5+)
Never Married	----------	---	11	

18 USUAL OCCUPATION (Give kind of work done during most of working life. DO NOT USE RETIRED)	19 KIND OF BUSINESS OR INDUSTRY	20. Was Decedent of Hispanic origin or descent? (Ancestry) (Specify Yes or No. If Yes, specify Cuban, Mexican, Puerto Rican, etc.) (Yes / No) Specify:	21 RACE (Specify)
Student	----------	No	White

22 RESIDENCE—NUMBER AND STREET	23 CITY/TOWN OR LOCATION	24 INSIDE CITY LIMITS? (Yes / No)	25A COUNTY	25B. LENGTH OF RES IN CO	26 STATE	27 ZIP CODE
	---	NO		17 yrs	WA	[redacted]

PARENTS

28 FATHER'S NAME—FIRST, MIDDLE, LAST	29 MOTHER'S NAME—FIRST, MIDDLE, MAIDEN SURNAME
---	[redacted]

30 INFORMANT—NAME	31 MAILING ADDRESS (STREET OR RFD NO)	CITY OR TOWN	STATE	ZIP

DISPOSITION

32 BURIAL, CREMATION, REMOVAL, OTHER (Specify)	33 DATE (Mo. Day. Yr)	34 CEMETERY/CREMATORY—NAME	35 LOCATION—CITY/TOWN, STATE
Burial	[redacted] 1995		

36 FUNERAL DIRECTOR SIGNATURE	37 NAME OF FACILITY	38 ADDRESS OF FACILITY
[redacted]		[redacted]

CERTIFIER

TO BE COMPLETED ONLY BY **CERTIFYING PHYSICIAN**	TO BE COMPLETED ONLY BY **MEDICAL EXAMINER OR CORONER**
39 **TO THE BEST OF MY KNOWLEDGE**, DEATH OCCURRED AT THE TIME, DATE AND PLACE AND WAS DUE TO THE CAUSE(S) STATED SIGNATURE AND TITLE X	43 ON THE BASIS OF EXAMINATION AND/OR INVESTIGATION, IN MY OPINION DEATH OCCURRED AT THE TIME [redacted] SIGNATURE AND TITLE X [redacted]
40 DATE SIGNED (Mo. Day. Yr)	41 HOUR OF DEATH (24 Hrs.)
42 NAME AND TITLE OF ATTENDING PHYSICIAN IF OTHER THAN CERTIFIER (Type or Print)	44 DATE SIGNED (Mo., Day, Yr) [redacted] /1995
	45 HOUR OF DEATH (24 Hrs) 1755 HRS
	46 PRONOUNCED DEAD (Mo., Day, Yr) [redacted] /1995
	47 HOUR PRONOUNCED DEAD (24 Hrs.) 1755 HRS
48. NAME AND ADDRESS OF CERTIFIER—PHYSICIAN, MEDICAL EXAMINER OR CORONER (Type or Print) [redacted]	49 ME/CORONER FILE NUMBER [redacted]

CAUSE OF DEATH

50 ENTER THE DISEASES, INJURIES, OR COMPLICATIONS WHICH CAUSED THE DEATH.

		INTERVAL BETWEEN ONSET AND DEATH
IMMEDIATE CAUSE (Final disease or condition resulting in death)	A Massive Head Injuries	
DO NOT ENTER THE MODE OF DYING, SUCH AS CARDIAC OR RESPIRATORY ARREST, SHOCK, OR HEART FAILURE. LIST ONLY ONE CAUSE ON EACH LINE. Sequentially list conditions, if any, leading to immediate cause. Enter UNDERLYING CAUSE (Disease or injury which initiated events resulting in death) LAST	DUE TO, OR AS A CONSEQUENCE OF B	
	DUE TO, OR AS A CONSEQUENCE OF C	
	DUE TO, OR AS A CONSEQUENCE OF D	

51 OTHER SIGNIFICANT CONDITIONS—CONDITIONS CONTRIBUTING TO DEATH BUT NOT RESULTING IN THE UNDERLYING CAUSE GIVEN ABOVE.	52. AUTOPSY? (Yes / No)	53 WAS CASE REFERRED TO MEDICAL EXAMINER OR CORONER? (Yes / No)
	Yes	Yes

54 ACC, SUICIDE, HOM., UNDET OR PENDING INVEST. (Specify)	55 INJURY DATE (Mo, Day, Yr)	56 HOUR OF INJURY (24 Hrs)	57 DESCRIBE HOW INJURY OCCURRED
Accident	[redacted] /1995	1500 HRS	2 car accident

58 INJURY AT WORK? (Yes / No)	59 PLACE OF INJURY—AT HOME, FARM, STREET, FACTORY, OFFICE BLDG, ETC (Specify)	60 LOCATION—STREET OR RFD NO., CITY/TOWN, STATE
No	Street	[redacted], WA

61 RECORD AMENDMENT (Registrar use only) ITEM	DOCUMENTARY EVIDENCE	REVIEWED BY	DATE	62 REGISTRAR SIGNATURE	63 DATE RECEIVED (Mo., Day, Yr.)

A

[redacted] ER [redacted]

RECEIVED

[redacted]

Ya[redacted]on

POSTMORTEM REPORT

I.

Patient [redacted] Age 11 Race C Sex F Hospital N [redacted]

Date Expired [redacted]95 1995 Time 1155 am/pm Moved to morgue by [redacted] Hr. [redacted]

Attending Physician [redacted] .N. signature [redacted]

II. AUTHORIZATION FOR AUTOPSY, REMOVAL AND RETENTION OF ORGANS

Permission is hereby granted to [redacted] Hospital and to its authorized representatives to perform a complete (*) autopsy on the body of [redacted] to determine the cause of death and nature of the disease process or processes and to remove and retain any structure or organ, including eyes, for study and diagnosis and other scientific or therapeutic purposes and uses including, when appropriate, the treatment of living patients. (*)This authorization shall be subject to the following restrictions: [redacted]

The undersigned represents that he is the person legally entitled to give authorization for such autopsy and for the removal and retention of organs and tissues of the deceased named herein, and releases [redacted] Hospital and members of its staff from any liability arising out of the performance of such autopsy.

Signe[redacted] Witness: [redacted]

Relationship to deceased: mother Witnes[redacted]

Pathologist notified [redacted] Time: [redacted] am/pm. By [redacted]

Autopsy completed: Date [redacted] 19[redacted] Time [redacted] am/pm. By [redacted]

III. AUTHORIZATION FOR RELEASE OF BODY

I hereby authorize and direct [redacted] to release the body of [redacted]

[redacted] To [redacted] (mortician) [redacted] (address)

Signed: [redacted]

Relationship to deceased: mother

IV. CERTIFICATE OF REMOVAL

The body of [redacted] has been removed [redacted]

Name of Mortician [redacted] Date [redacted] 1995 Time 4:45 am/pm.

DIRECTIONS FOR COMPLETION

PART I. Nurse sending the body to the morgue completes entries and signs.

PART II. Unit supervisor completes, obtains signature of person giving permission. (See procedure) If information is not available, forward form to House Supervisor for followup.

PART III. House Supervisor will notify pathologist if permission for autopsy is secured. Upon completion of entries, forward to the Switchboard.

PART IV. Completed by mortician. (Form will be retained at the Switchboard for pathologist to examine if a postmortem examination is held)

DISTRIBUTION: Original: Medical Records
Copy: Mortician.

[redacted]